# MATH 4341 – Combinatorial Design Theory Assignment #2 Winter 2013

**Instructions**

- Answer each question completely; justify your answers.
- This assignment is due at 15:00 on Friday January 25th in Assignment Box #48.

1. Find a BIBD$(9, 3, 1)$.
2. Suppose that a BIBD has $v = 8$ and $k = 4$. Prove that $b \geqslant 14$.
3. Prove that no BIBD(10,8,4,5,2) can exist.
4. Does the BIBD$(7, 7, 3, 3, 1)$ have an SDR?
5. How many SDRs are there for the design with these blocks: 123, 234, 345, 451, 512 ?
6. Suppose that the design $\mathcal{D}$ has an SDR and suppose that each block of $\mathcal{D}$ has at least $t$ elements. Prove that if $t \leqslant b$ then $\mathcal{D}$ has at least $t!$ SDRs.